

REMARKS

Claims 1-11 are pending in this application.

Claim 1 has been amended to include "one or more second solvent selected from the group consisting of N,N'-dimethylacetamide and N,N'-dimethylimidazolidinone," which was recited in claim 13. Also, claims 12-14 have been cancelled.

Further, claims 2 and 5 have been amended to address the 112, second paragraph rejection.

No new matter has been added by way of the present submission.

Additionally, no new issues have been raised which would require additional search and/or consideration on the part of the Examiner. In particular, amended claim 1 is simply relying upon the language of claim 13, which has already been searched and considered. In the event that the present submission does not place the application into condition for allowance, entry thereof is respectfully requested as placing the application into better form for appeal.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

1. Issues Under 35 U.S.C. § 112, Second Paragraph

Claims 2, 3, 5, 12 and 14 are rejected under 35 U.S.C. § 112, second paragraph, for being allegedly indefinite. This rejection is respectfully traversed.

With respect to claims 2 and 3, the Examiner rejects claim 2 for not further limiting the subject matter of claim 1. In this Reply, Applicants have amended claim 2 according to the Examiner's suggestion.

With respect to claim 5, the Examiner rejects claim 5 for the reason that the limitations of claim 5 are not fully consistent with the limitations of claim 1. Therefore, to resolve this part of the rejection, the limitations of "p" and "r" are properly amended.

With regard to claims 12 and 14, Applicants cancelled these claims from the present application.

By way of the above amendments, this rejection is moot. Thus, reconsideration and withdrawal thereof are respectfully requested.

II. Prior Art Based Issues

II – A. Kosho et al. and Ito et al.

Claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kosho et al. (JP 2002-151272) in view of Ito et al. (US 5,993,694). This rejection is respectfully traversed.

Claim 10 is drawn to a solar cell which is made with the charge transporting varnish defined in claim 1.

Kosho et al. disclose an electroluminescent element comprising a positive and a negative electrodes, one or a plurality of layers of organic compounds, a carrier transport sub-layer of oligoaniline derivatives of formula (1), an electron accepting dopant and salts.

As Applicants argued at page 10 of the April 16, 2009 Reply, Kosho et al. have not recognized the problems of the varnish containing oligomers. In other words, a varnish containing an organic charge-transporting substance composed of an oligomer dissolved in a solvent tends to give rise to a film with surface irregularities due to aggregation after application and solvent evaporation, because it has a great intermolecular force due to π - π stacking effect and hence is poorer in dispersibility than polymeric materials having a sufficiently high molecular weight. Therefore, any layer formed with the oligomers of Kosho et al. would be expected to have the problem of surface irregularities. This is also described in the present specification beginning at page 2, line 32.

Further, Applicants respectfully direct the Examiner's attention to the Examples in the present specification which show that using the solvent of Kosho et al. gives inferior results to the presently claimed solvent combination.

For instance, the data from Table 2 at page 30 is reproduced (in part) below.

Table 2

	Film Thickness (nm)	Conductivity (S/cm) at 100 mA/cm ²	Surface Roughness		
			Standard Deviation Rms (nm)	Average Roughness Ra (nm)	Maximum Height Rmax (nm)
Example 1 (made with c-HexOH-DMAc, HexOH having a viscosity of 68 mPa·s at 20°C)	21	--	0.16	0.56	0.72
Example 1 (made with c-HexOH-DMAc, HexOH having a viscosity of 68 mPa·s at 20°C)	66	--	0.09	0.31	0.45
Comparative Example 1 (made with DMF, having a viscosity <50 mPa·s at 20°C)	15	--	0.53	2.76	3.08

A varnish containing a low viscosity solvent (DMF) as in Comparative Example 1 which is the same solvent as was used by Kosho et al. gave a film having a high surface roughness compared to a varnish containing a high viscosity solvent of cyclohexanol (c-HexOH) and N,N'-dimethylacetamide (DMAc) as in Inventive Example 1 which gave a film having a very low surface roughness over a variety of film thicknesses.

Applicants respectfully submit that the surface roughness shown in Comparative Example 1 would be similar to the surface roughness of the product of Example 1 (Table 1) of Kosho et al.

Therefore, there is a structural distinction between the solar cell of present claim 10 and the solar cell of Kosho et al.

Accordingly, present claim 10 is patentably distinct from Kosho et al. Also, the deficiencies of Kosho et al. cannot be cured by Ito et al. since the Ito et al. reference also fails to disclose or suggest the inventive solvents mixture.

Applicants note that the Examiner indicates on page 8 of the outstanding Office Action that claim 10 is silent with respect to surface irregularities.

However, Applicants are claiming the above-mentioned inventive features already that lead to such advantages. In this respect, the Examiner is respectfully reminded of the legal precedent, *In re Merchant*, 197 U.S.P.Q. 785, 788 (C.C.P.A. 1978), concerning objective evidence, as follows (*emphasis added*):

Finally, the solicitor repeats the objection voiced by the examiner that the declaration is irrelevant because the claims specify neither the unexpected result nor the “features” that produce that result. We are aware of no law requiring that unexpected results relied upon for patentability be recited in the claims. The “features” referred to by the examiner are the conditions of pressure, feed rate, and reactor retention time for the commercial operation described in the declaration. We are equally unaware of any law requiring that commercial production parameters be claimed. Moreover, the “feature” responsible for appellant's unexpected results is recited in the claims, viz., “substantially anhydrous.” (Emphasis added.)

Here, reduced surface irregularities are the superior effects revealed from using the claimed varnish. Applicants note the Examples and Table 2 of the present specification. These effects cannot be obtained by Kosho et al. and such advantages do not have to be recited in view of the *In re Merchant* decision.

Reconsideration and withdrawal of the rejection are thus respectfully requested.

II – B. Fujita et al., Kosho et al., Amano et al. and Flick

1) Claims 1-4, 6-9 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al. (US 6,720,029) in view of Kosho et al. (JP 2002-151272), with evidence of inherency provided by Flick (*Industrial Solvents Handbook*, 5th edition, p. 367); and

2) Claims 1-3, 5, 7-9 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al. (US 6,720,029) in view of Amano et al. (JP 04-304465), with evidence of inherency provided by Flick (*Industrial Solvents Handbook*, 5th edition, p. 367).

These rejections are respectfully traversed.

While not conceding to the Examiner's rejections, but to advance prosecution, claim 1 has been amended to further emphasize the distinctions between the present invention and the cited references.

With respect to our assertion that the present invention includes advantages over the cited references, the Examiner has responded at page 9 with the following statement:

Regarding advantages/improvements provided by a varnish according to the present claims, the data of record do not demonstrate unexpected results commensurate in scope with the claims. While the varnish of the present claims requires a high-viscosity solvent as recited in claims 1 and 14, the varnish composition is open to other solvents that are not high-viscosity solvents, and claims 12-14 require additional solvents. In addition to the "high-solvency" solvent required by claims 12-14, the varnish may comprise additional solvents as described in the first two paragraphs on page 18 of the specification. None of the present claims limit the amount of high-viscosity solvent in the varnish, and the claims encompass varnishes in which a relatively large proportion of the varnish (and/or relatively large proportion of the solvent in the varnish) is a solvent within the scope of those explicitly taught by Fujita et al. and by Kosho et al. There is insufficient evidence of record to demonstrate that the mere inclusion of a high-viscosity solvent in a varnish, regardless of relative amounts of high-viscosity solvents and other components in the varnish, provides unexpected results.

From this statement, the Examiner has argued that the evidence of improved results (unexpected results) is not commensurate in scope with the presently claimed invention. Also, the Examiner focuses on the relative amounts of the components in the varnish. However, Applicants respectfully disagree.

According to US practice, the skilled artisan should be able to review the evidence of unexpected results and come to the reasonable conclusion that the unexpected results would be found for the entire scope of the present invention. In view of the amendment to claim 1, the scope of claim 1 is commensurate with the showing of unexpected results.

In addition, Applicants provide the following arguments.

The Present Invention and its Advantages

Claim 1 is directed to a charge-transporting varnish which comprises a charge-transporting substance composed of a charge-transporting oligomer having a number-average molecular weight of 200 to 2,000, or a charge-transporting organic material composed of said charge-transporting substance and an electron accepting dopant substance or hole accepting dopant substance, a first solvent containing at least one species of high-viscosity solvent having a viscosity of 50 to 200 mPa·s at 20°C, and one or more second solvents selected from the group consisting of N,N'-dimethylacetamide and N,N'-dimethylimidazolidinone, said charge-

transporting substance or charge-transporting organic material being dissolved or uniformly dispersed in said solvents.

A varnish containing an organic charge-transporting substance composed of an oligomer dissolved in a solvent tends to give rise to a film with surface irregularities due to aggregation after application and solvent evaporation, because it has a great intermolecular force due to π - π stacking effect and hence is poorer in dispersibility than polymeric materials having a sufficiently high molecular weight.

In order to solve the above-problems, the present invention adopts a charge-transporting oligomer having a number-average molecular weight of 200 to 2,000 as a charge-transporting substance in a varnish (emphasis added).

Also, a varnish containing such an oligomer which is dissolved or uniformly dispersed in a high-viscosity solvent having a viscosity of 50 to 200 mPa.s at 20°C and a second solvent N,N'-dimethylacetamide and/or N,N'-dimethylimidazolidinone, has a comparatively low flowability and prevents the materials and solvents from aggregating due to solvent evaporation at the time of film formation. Thus, the varnish of the present invention gives rise to a highly uniform thin film that can be used as the hole injection layer of organic EL elements. See Tables 2-5 of the specification.

Distinctions over Fujita et al., in view of Kosho et al., or Fujita et al., in view of Amano et al.

Fujita et al. disclose coating liquids containing polymer such as polyaniline Pre-PPV and solvent. Also, Fujita et al. teach that suitable solvents for the coating liquids include propylene glycol.

However, Fujita et al. fail to disclose or teach that N,N'-dimethylacetamide and/or N,N'-dimethylimidazolidinone are suitable solvents for the coating liquid. Also, Fujita et al. fail to disclose or teach a varnish containing mixed solvents composed of a first high-viscosity solvent and a second solvent N,N'-dimethylacetamide and/or N,N'-dimethylimidazolidinone. Further, Fujita et al. fails to disclose or suggest the charge-transporting oligomer having a number-average molecular weight of 200 to 2,000.

As explained above, Kosho et al. fail to disclose a varnish containing such mixed solvents. Amano et al. lack such inventive features in the same context.

Accordingly, those skilled in the art would not find the inventive varnish obvious from Fujita et al. in view of Kosho et al. or Amano et al.

As the MPEP directs, all the claim limitations must be taught or suggested by the prior art to establish a *prima facie* case of obviousness. See MPEP § 2143.03. In view of the fact that the cited references fail to teach or fairly suggest the claimed features, a *prima facie* case of obviousness cannot be said to exist.

In light of the above remarks, since the amended independent claim 1 of the present application is believed to overcome the 35 USC § 103(a) rejections, the claims dependent therefrom are also believed to address the same rejections. Therefore, the Examiner is respectfully requested to reconsider and withdraw these rejections.

Conclusion

In view of the above remarks, Applicants believe the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq., Reg. No. 43,575, at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

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Respectfully submitted,

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